

Scr. No. 10/618,059

Amendments to the Claims

1. (Currently amended) ~~A coolant nozzle for use on a machine tool having a rotating bit~~ An apparatus comprising:
a machine tool;
an elongate abrasive bit carried by the machine tool; and
a nozzle, the nozzle comprising a sintered body having:
at least one coolant inlet;
at least one a plurality of coolant outlet outlets, no gap in either circumferential
direction between sequentially adjacent ones of the outlets being more than 72°;
internal surface portions defining one or more passageways between the at least one coolant inlet the and at least one coolant outlet; and
an aperture ~~for~~ accommodating the bit.
2. (Currently amended) The ~~nozzle~~ apparatus of claim 1 wherein the sintered body is a single unitary piece.
3. (Currently amended) The ~~nozzle~~ apparatus of claim 1 wherein the one or more passageways includes a plenum surrounding the aperture.
4. (Currently amended) The ~~nozzle~~ apparatus of claim 1 wherein the ~~at least one coolant outlet comprises a~~ plurality of coolant outlets are symmetric around an axis.
5. (Currently amended) The ~~nozzle~~ apparatus of claim 1 wherein the ~~at least one coolant outlet comprises a~~ plurality of coolant outlets are positioned to direct associated coolant outlet streams toward an axis of the bit when said bit is in an installed position.
6. (Currently amended) The ~~nozzle~~ apparatus of claim 5 wherein the plurality of coolant outlets are elongate.

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7. (Currently amended) The ~~nozzle~~ apparatus of claim 5 wherein the plurality of coolant outlets comprises at least five outlets and the at least one coolant inlet is a single coolant inlet.
8. (Currently amended) The ~~nozzle~~ apparatus of claim 1 wherein the aperture has a diameter of less than 3cm.
9. (Canceled)
10. (Currently amended) ~~A coolant nozzle for use on a machine tool having a rotating bit~~ An apparatus comprising:
a machine tool;
an elongate abrasive bit carried by the machine tool; and
a nozzle, the nozzle comprising:
a through-aperture for accommodating the bit;
a coolant inlet;
a plurality of coolant outlets at more than one angular position about the through-aperture and oriented to discharge associated coolant outlet streams to impact obliquely toward a tip of the bit along a side of the bit, ~~circumferential spacing between~~
~~no adjacent two of the outlets~~ no gap in either circumferential direction between
sequentially adjacent ones of the outlets being more than 72°, there being no other coolant outlets in addition to the plurality of coolant outlets; and
internal surface portions defining one or more passageways between the coolant inlet the and the plurality of coolant outlets.
11. (Currently amended) The ~~nozzle~~ apparatus of claim 10 wherein the plurality of coolant outlets are each at a common radial position relative to an axis and are each at a unique angular position about said axis.
12. (Canceled)

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13. (Currently amended) The ~~nozzle~~ apparatus of claim 10 wherein the nozzle surrounds a full 360° of the through-aperture.
14. (Currently amended) The ~~nozzle~~ apparatus of claim 1 wherein the plurality of at least one coolant outlet is outlets are angled to provide essentially total coverage along a length of an abrasive portion of the bit.
15. (Currently amended) The ~~nozzle~~ apparatus of claim 1 wherein the ~~at least one~~ plurality of coolant outlet ~~provides~~ outlets provide a redundant coverage around the entire circumference of the bit so that, during a machining operation, the effects of a workpiece blocking one or more sprays of the coolant are limited.
16. (Currently amended) ~~A coolant nozzle in combination with a machine tool having a rotating abrasive quill~~ An apparatus comprising:
 a machine tool;
 a rotating abrasive quill carried by the machine tool; and
 a nozzle, the nozzle comprising a sintered body and having:
 at least one coolant inlet;
 at least one coolant outlet discharging a plurality of liquid coolant outlet streams impacting obliquely toward a tip of the quill along a side of the quill; .
 internal surface portions defining one or more passageways along essentially an entire circumference of the quill between the at least one coolant inlet and the at least one coolant outlet; and
 an aperture accommodating the quill.
17. (Canceled)
18. (Currently amended) The ~~nozzle~~ apparatus of claim 16 formed of a sintered ceramic.
19. (Currently amended) The ~~nozzle~~ apparatus of claim 16 wherein the at least one coolant

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outlet comprises at least five outlets and the at least one coolant inlet is a single coolant inlet.

20. (Currently amended) ~~A coolant nozzle in combination with a machine tool having a rotating bit~~ An apparatus comprising:

a machine tool;

a rotating abrasive bit carried by the machine tool; and

a nozzle, the nozzle comprising a sintered body and having:

a through-aperture accommodating the bit;

a coolant inlet;

a plurality of coolant outlets at more than one angular position about the through-aperture and oriented to discharge associated coolant outlet streams and having circumferential spacing between each of the outlets and an associated first and second adjacent ones of the outlets on respective first and second sides of said outlet of no more than 72°; and

internal surface portions defining one or more passageways between the coolant inlet the and the plurality of coolant outlets.

21. (Currently amended) The ~~nozzle~~ apparatus of claim 20 wherein the bit is an elongate superabrasive quill.

22. (Currently amended) The ~~nozzle~~ apparatus of claim 20 wherein the bit has a doubly convex head portion and a distal shaft portion which have an abrasive coating or embedded abrasive particles.

23. (Currently amended) The ~~nozzle~~ apparatus of claim 20 having a sintered nozzle body.

24. (Currently amended) The ~~combination of claim 9~~ apparatus of claim 1 wherein the coolant is water based or comprises oil.

25. (New) The apparatus of claim 1 wherein the one or more passageways include:
a feed trunk; and

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a plenum between the feed trunk and the outlets.

26. (New) The apparatus of claim 16 wherein the liquid coolant outlet streams have centerlines meeting the bit at an acute angle to a rotational axis of the bit.